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A FURTHER REPORT IN REGARD TO THE
TREATMENT OF ENTERIC OR TYPHOID
FEVER BY MEANS OF SYSTEMATIC
COLD BATHING, IN THE GERMAN
HOSPITAL, PHILADELPHIA.

BY

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IN THE JEFFERSON MEDICAL COLLEGE.



FROM

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THE treatment of enteric fever by systematic cold bathing, according to the method of Brand, has now been practised in the German Hospital since the first of February, 1890. It is the only treatment employed, and all patients suffering from this disease are submitted to it, except very rare cases brought into the hospital moribund, or those that are brought in late in the course of the attack—*i. e.*, during or after the third week.

I have already published some accounts of the treatment as practised in the hospital, and its results. These publications¹ cover the work to June 1, 1891, and contain the results of the analysis of three series of cases, as follows:

1. February 1 to July 15, 1890, under my service, 40 cases, no deaths; average number of days in hospital, 36.2.

2. July 15, 1890, to February 1, 1891, services of Dr. Trau and Dr. Wolff, 54 cases, 1 death; average number of days in the hospital, 38.2.

3. February 1 to June 1, 1891, under my service, 66 cases, 7 deaths; average number of days in hospital of the non-fatal cases, 26.

Total in 16 months, 160; total deaths, 8, or 5 per cent.

¹ THE MEDICAL NEWS, December 6, 1890, p. 588. International Clinics, July, 1891.

In the above series of cases relapses occurred eleven times, multiple relapses once. The average number of baths in the cases of the first series was 42; the smallest 10; the largest, 138.

The medical service during the year is divided into three periods of four months each. As the treatment is a matter of routine, and systematically carried out in each of the services, the cases may hereafter be reported in annual series.

The following table, compiled from the records of the hospital by Dr. Woodward, late resident physician, shows the statistics for the year, June 1, 1891, to June 1, 1892:

CASES OF ENTERIC FEVER TREATED BY SYSTEMATIC COLD BATHING.

Series No. 4. June 1, 1891, to June 1, 1892.

No.	Admission.	Sex.	Age.	Day of disease	Max. temp.	1st day norm. temp.	Days in house.	Number of baths.
	1891.							
1	June 7	F.	22	7	105.4	21	36	43
2	" 8	M.	22	10	105.2	28	36	80
3	" 12	F.	20	7	104.6	20	41	29 ¹
4	" 25	M.	18	8	107.6	32	49	103
5	" 27	M.	27	8	105.0	31	38	65
6	" 28	F.	24	11	103.6	17	27	17
7	" 28	F.	18	6	104.8	25	23	48
8	July 6	M.	24	7	106.0	27	35	27
9	" 9	M.	28	3	102.4	10	18	2
10	" 22	M.	31	7	104.0	18	29	28
11	" 22	M.	18	7	104.4	18	26	31
12	" 28	M.	25	8	104.4	30	38	57
13	" 29	M.	40	4	103.6	34	47	41 ²
14	Aug 4	M.	28	5	105.4	45	69	34 ³
15	" 5	F.	20	9	104.0	29	41	41 ⁴
16	" 7	M.	18	8	104.8	31	33	86
17	" 8	M.	29	7	104.0	26	33	29
18	" 18	M.	30	10	103.6	18	35	11
19	" 20	F.	28	3	104.4	23	37	31
20	" 27	M.	25	6	104.4	18	27	40
21	Sept. 4	F.	42	7	103.6	32	42	13
22	" 14	M.	19	...	108.0	...	41	54
23	" 14	F.	32	...	103.4	...	20	15
24	" 19	F.	42	...	102.2	...	15	1
25	" 21	F.	26	...	103.4	...	24	20
26	" 22	F.	18	...	104.8	...	27	39
27	" 22	F.	32	...	104.2	...	26	8

¹ One relapse.

² One relapse.

³ Two relapses.

⁴ One relapse.

No.	Admission.	Sex.	Age.	Day of disease	Max. temp.	1st day norm. temp.	Days in house.	Number of baths.
28	" 22	F.	26	...	103.6	...	16	9
29	" 27	F.	21	...	105.8	...	53	33
30	" 28	F.	24	...	102.6	...	19	5
31	Oct. 6	M.	17	...	102.4	...	48	5 ⁵
32	" 13	M.	29	...	105.4	...	42	73
33	" 19	F.	22	...	105.0	...	70	92
34	Nov. 4	M.	22	...	103.0	...	45	17
35	" 7	M.	22	...	104.0	...	14	4
36	" 9	M.	27	...	103.0	...	35	14
37	" 13	M.	26	...	103.8	...	22	15
38	" 14	M.	24	...	104.6	...	30	54
39	" 18	F.	18	...	105.8	...	61	121 ⁶
40	Dec. 13	M.	22	...	103.2	...	37	5
41	" 17	M.	35	...	104.2	...	52	62 ⁷
42	Jan. 5	M.	18	...	104.4	...	28	32
43	" 6	M.	31	...	103.6	...	26	39
44	" 16	M.	20	...	103.8	...	32	34
45	" 17	M.	19	...	104.6	...	6	34 ⁸
46	" 17	F.	14	6	106.6	33	66	138
47	" 20	M.	22	5	105.2	24	31	80
48	" 23	M.	18	7	105.0	15	23	38
49	" 24	F.	26	10	108.4	...	11	50 ⁹
50	" 31	M.	13	3	104.0	...	15	75 ¹⁰
51	" 26	F.	27	1	102.8	13	21	8
52	Feb. 1	M.	19	7	105.0	48	26	37
53	" 1	M.	25	5	104.6	31	48	106 ¹¹
54	" 1	F.	16	10	104.6	20	29	23
55	" 6	F.	18	5	103.4	24	32	35
56	" 8	M.	26	2	103.0	13	21	25
57	" 18	M.	27	9	105.2	34	41	47 ¹²
58	" 19	F.	29	11	103.6	30	38	43
59	" 20	F.	22	5	105.4	15	17	41
60	" 28	M.	24	8	106.0	...	16	76 ¹³
61	Mar. 21	F.	28	9	105.2	26	29	33
62	April 5	F.	22	6	104.4	15	23	8
63	" 7	M.	26	4	103.4	24	31	11
64	" 12	M.	14	7	103.4	20	24	11
65	" 10	M.	29	7	104.8	48	65	149 ¹⁴
66	May 7	M.	26	7	105.0	28	45	105

Total, 66 cases. Deaths, 4. Mortality, 6 per cent.

⁵ (Insane before admission.) Developed insanity.

⁶ One relapse.

⁷ Relapse after ten days of normal temperature.

⁸ Death—croupous pneumonia.

⁹ Death. Pronounced nervous symptoms from outset.

¹⁰ Death from cerebral meningitis.

¹¹ Intestinal hemorrhage.

¹² One relapse; intestinal hemorrhage.

¹³ Death—pneumonia and intestinal hemorrhage.

¹⁴ One relapse.

The fatal cases were as follows :

No. 45.—H. S., male, nineteen years of age, a barber, died six days after admission, of double pneumonia.

No. 49.—A. S., female, twenty-six years of age, was admitted on the tenth day of the disease. From the outset the temperature ran very high. The nervous system was greatly affected, culminating in delirium five days before death. She lived eleven days in the hospital. One half hour after death the thermometer registered 109.8° .

No. 50.—L. H., male, thirteen years old, was admitted on the third day of the disease. He died on the fifteenth day, with symptoms of cerebral meningitis.

No. 60.—O. C., male, twenty-four years old, was admitted on the eighth day of the disease. He developed pneumonia on the seventeenth day; intestinal hemorrhage on the nineteenth day, twentieth day, twenty-second day; and died on the twenty-third day.

The foregoing table shows the main facts in regard to this series of cases.

The patients were chiefly adolescents and young adults, their ages ranging from thirteen to forty-two years, as follows :

Under 15 years	3 cases.
From 15 to 20 years	14 "
" 20 " 25 "	18 "
" 25 " 30 "	22 "
" 30 " 35 "	5 "
" 35 " 40 "	1 case.
" 40 " 42 "	3 cases.

Relapses occurred in 8 cases, 12 per cent., in 1 of which a second relapse took place.

The average number of baths administered was about 44; the smallest, 1; the largest, 149. In 2 cases 5 baths only were given; in 1 case, 4 baths; in 1, 2 baths; and in 1, 1 only. These were either abortive cases or cases admitted late in the course of the disease, in which the axillary temperature after the last bath never rose to 101.5° .

The average number of days in the hospital of the non-fatal cases was about 35.

The total number of cases treated by this method to June 1, 1892, is 226; the total deaths, 12—5.3 per cent. In the entire series of 226 cases relapses occurred in 19 instances; more than 1 relapse occurred in 2 cases.

The statistics of the German Hospital now rest on a sufficient number of cases and extend over time enough to warrant conclusions as to the efficiency of the treatment in an American hospital. It has reduced the death-rate in this institution nearly 50 per cent. from the best showing of previous years, and 66 per cent. from the most favorable statistics of the hospitals of the city under other methods.

It is our custom at the German Hospital to administer to the patient upon admission, if before the 10th day, a laxative dose of calomel, from gr. vijss-x, and in cases entering the hospital during the first week this dose is very often repeated; otherwise, the management of the cases in almost all instances conforms strictly to the method of Brand. The necessity to depart from the routine plan in any particular has scarcely ever arisen in my service. In the services of Dr. Trau and Dr. Wolff it has been infrequent, but not to the same extent.

When patients are admitted after the disease has made some progress, at the end of the first or during the second week, pending the influence of the baths in controlling some of the more important symptoms, an influence which does not show itself until a number of baths have been administered, it has been thought necessary occasionally to administer strychnine as a cardiac stimulant; and to control a troublesome diarrhea not moderating after the action of the calomel, by an occasional opium-suppository. The maxim of universal application, that the patient, and not the disease, is to be treated, is constantly observed.

The details of the method of Brand are fortunately becoming well understood, but as these may

not be familiar to some, I reprint the following from THE MEDICAL NEWS, of December 6, 1890:¹

The method of Brand consists in the following systematic procedure:

Whenever the temperature taken in the rectum reaches 102.2° F. (39° C.) the patient is placed in a bath of 65° F. A compress, wet with water about five degrees lower, is placed upon the head, or water at a lower temperature is poured upon the head and shoulders. The patient remains in the bath fifteen minutes, during which time he is systematically rubbed by the attendants and encouraged to rub himself. At the expiration of that time he is removed from the bath, and wrapped in a coarse linen sheet, over which a blanket is folded, the extremities being thoroughly dried and rubbed. A little wine or spirits is then given. This is repeated every three hours, unless the temperature remains below 102.2° F. The alimentation is liquid, nutritious, and carefully regulated. No drugs are administered.

Glénard² gives the following outline of the technique:

"If the diagnosis of typhoid fever is probable, recourse should be had to the baths, whatever may be the symptoms. The full tub should be placed in the ward or chamber, parallel to the bed at a distance of one or two meters, the floors properly protected by oilcloth, and a screen placed between the bed and the bath-tub. A sufficient quantity of water should be used to cover the patient's body to the neck. It should be of a temperature of from 64.4° to 68° F. (18° to 20° C.). The baths should be prepared without disturbance or noise. There should be placed on the floor near the head of the tub two pitchers of cold water of a temperature of from 46.4° to 50° F. (8° to 10° C.), each containing four or five quarts (liters). A glass of water should be at hand. The first bath should be given preferably about four o'clock in the afternoon, unless there is some urgent reason for selecting a different hour, and the physician should be present. The rectal temperature is taken, the urine is voided, and the patient is assisted into the full tub, the screen having been removed. If there is perspiration the patient is dried before entering the bath. Cold water from the pitchers is poured upon the head and the back of the neck, for one or two minutes, the amount being from two to three quarts (liters). Then a swallow of cold water or red wine is given. This being done, the whole surface of the body is briskly rubbed with a sponge or brush, and the patient is made to rub his abdomen and chest. These frictions stimulate the peripheral circulation, pre-

¹ "The Treatment of Enteric Fever, with Special Reference to the Method of Brand. An Address before the Lycoming County Medical Society, delivered at Williamsport, Pa., Nov. 4, 1890."

² Le Bulletin Médical, February 26, 1888

vent the accumulation of heat at any one point, moderate the sensation of cold, and help to pass the time; they are not indispensable. Shivering appears, as a general rule, in between eight and twelve minutes; this is a necessary evil to which too much attention is not to be paid. Toward the middle of the bath, or at its termination, cold water is again poured over the head and neck. The time occupied ought to be at least fifteen minutes, longer if the head is still warm and the cheeks red, or if the temperature of the patient was very high before the bath.

"The patient should leave the bath without precipitation. He cannot take cold; thoracic complications are caused by typhoid fever and not by chilling. The air of the apartment should be pure and not too warm; the window should be opened in the intervals between the baths; during the bath it ought to be closed. On leaving the bath, the patient should be gently dried with a towel. The bed should be carefully made during each bath. If on returning to the bed shivering takes place, the limbs should be rubbed and a hot bottle placed at the patient's feet. A cold compress, covered with oil-silk or flannel, should be placed over the abdomen, and a little warm nourishment administered.

"Three-quarters of an hour after the bath the rectal temperature should again be taken. If, however, it is found to be below 101° F. (38.5° C.), it is not necessary to take it again for three hours.

"Alimentation should consist of the following articles: Milk diluted with coffee or tea or cocoa (a quarter of a liter at each administration); thoroughly cooked gruel, oatmeal, tapioca, or vermicelli; veal, mutton, or chicken broth, freed from fat when cold, and reheated at the moment of administration. As a drink, pure cold water should be given; the indication for wine or spirits is urgent only in cases that are subjected to this treatment late in their course. If the patient does not sleep, or sleeps badly, he is to have a draught of iced water, and the abdominal compress is to be changed every quarter of an hour. The discharges from the bowels are to be preserved for inspection, and the total quantity of urine may be collected in the same vessel. Neither age, sex, menstruation, pregnancy, nor sweating (except that which occurs at the end of defervescence) in any way modifies the treatment. In women who are weaning their children, cold compresses should be applied to the breasts and be frequently renewed. If diarrhea persists, it is to be combated by cold compresses, which may be kept cold by the aid of a bladder of ice. If there is constipation, it is to be treated by cold enemata, and, if these fail, by enemata consisting of one part of cold water and one part of fresh ox-gall.

"When the temperature before the bath is very high, or if the fall forty-five minutes after the bath is less than

1.8° F. (1° C.), the bath must be prolonged to eighteen or twenty minutes. It is very rarely necessary to modify the general formula. After the temperature does not exceed 109.2° F. (39° C.), but yet reaches 101.3° F. (38.5° C.), it is necessary to treat these slight exacerbations by baths of 68° F. (20° C.), and of five minutes' duration, in order to prevent the prolongation of the fever or the occurrence of relapse, and to shorten convalescence. If relapse occurs, it must be treated according to the general formula. When the temperature no longer exceeds 101.3° F. (38.5° C.), defervescence being established, the baths are discontinued, and the patient should be treated as convalescent, but is to be kept in bed until the temperature has not exceeded 100.4° F. (38° C.) for four days. He may then rise and in a short time walk in the open air; he may prolong his promenades according to his strength, and one will be struck by the rapidity with which his strength increases after every outing. Proper precautions are to be taken against cold. As to alimentation, already during defervescence there may be added to his soup, milk, or bouillon, either one or two raw eggs daily, or, a little later, one or two teaspoonfuls of scraped raw meat or a little toasted bread or biscuit; but the aliment must always be given in liquid form.

"The *régime* of the convalescence should be gradually established, and may consist of solid food after the temperature has not risen above 100.4° F. (38° C.) for four days.¹ At this period the intervals between the feedings should be at first three hours during the day; afterward one regular meal daily may be given; and a little later the patient may have roast beef and fish, morning and evening, and bread in small quantities. The appetite is excellent, and it is necessary to control it. For the first two days of the convalescence the temperature is to be taken as before; after that, for a week, morning and evening. At the end of that time temperature observations may be discontinued.

"During the treatment by baths, one attendant is required for the day and one for the night; these duties may be fulfilled by members of the family. In a hospital one bath-tub may be used for a dozen patients, but it is better to use one for six patients. Two attendants are sufficient for twelve patients. It is not necessary to renew the water of the bath every three hours; once in twenty-four hours is sufficient. The patient treated from the beginning in this manner never suffers from fecal incontinence. As a rule, the patient should pass his water before entering the bath. During epidemics the water of the bath, if it is not soiled, should

¹ Better not until the evening temperature has not risen above normal, say 99.5°, for a week. The unstable temperature of convalescence deprives transitory rises to 100.4° or thereabouts of any great significance.—J. C. W.

serve for several patients, and should only be renewed two or three times a day."

This is the line of treatment to which, rigorously carried out, the extraordinary results which I have indicated are ascribed. That it seems heroic, thus briefly stated, cannot be denied. That it is heroic to those who see it practised for the first time is more than true. Preconceived notions in regard to the management of typhoid cases are violated. The frequent disturbance for the purpose of taking temperatures and bathing, the fact that the patients are compelled to rise from their bed, and with the aid of the attendants, to step into the bath, the pallor, shivering, and the blueness of the extremities which show themselves during the course of the bath, and continue for a varying time after the patient is put to bed, demand conviction on the part of the physician, and the courage of conviction to continue.

It is only when the favorable effect upon the condition of the patient is seen, and when we reflect that in every hundred cases at least ten lives, which would be lost under the expectant-symptomatic treatment, are saved by strict cold bathing, that we dare to proceed.

What is the effect upon the course of the disease in cases treated from the beginning; that is, before the fifth day? Brand declares that the classical picture of typhoid fever is no longer seen. It may be objected to this that we do not get our cases before the fifth day; and even if they come under observation so early a positive diagnosis cannot always be made at that time. Only in garrison life and in epidemics will a treatment so radical be justifiable at the onset of a vague febrile disease. But Brand's statement is true of cases in which treatment is instituted at a later period, even so late as the middle of the second week. After six or eight baths the familiar picture is no longer seen. Delirium ceases, stupor gives way to light somnolence, from which the patient is easily aroused with a bright expression and a clear mind. The tongue becomes moist and clean, and remains so. There is desire for food, and very commonly a complaint of hunger. The abdomen is not tympanitic. Diarrhea is rarely excessive or troublesome. In short, there remains, in the words of Brand, of the ordinary picture of typhoid nothing more than (*a*) a moderate fever, (*b*) an unimportant bronchial catarrh, (*c*) enlargement of the spleen, (*d*) the rose rash, and (*e*) infiltration of the intestinal glands. Everything else is prevented, and what might have been a severe case runs its course as a mild one if the patients are brought under treatment sufficiently early. Exceptions to this statement occur only when complications develop at the onset. There are rapid wasting and progressive anemia, as in all prolonged febrile diseases, but severe enteric fever is changed to mild, the mild to a still milder form.

This is brought about through the control of the temperature and by preventing disturbances of normal functions. The treatment is directed against the typhoid process as an entirety.

It does, it is true, not only reduce the temperature; the repetition of the bath also *controls* the temperature and keeps it down. But the bath does much more than this. It acts upon the nervous system in such a manner as to enable it to withstand the toxic influences of the infecting principle and the product of its evolution. This it doubtless does by the action of cold water upon the peripheral nerve-endings, a reflex stimulus being transmitted to the nerve-centers presiding over the circulation, respiration, digestion, excretion, and nutrition. This general reinforcement of function is shown by improved action of the heart, the first sound continuing distinct, the pulse being slower and more regular, and the improvement in the arterial tension showing itself by an absence of diastolic murmurs; by persistence of appetite and digestive power, permitting freer alimentation without gastric disturbances; by deepening and slowing of the respiration; and by the absence of nervous symptoms, the increased excretion, the prevention of complications, and the rapid convalescence.

As was pointed out by Jürgensen, every attempt to deviate from the routine treatment as above laid down is followed by less satisfactory results. The treatment thus stands by itself as a definite procedure, to be distinguished from treatment by graduated baths, the cold pack, cold affusions, spraying, and other hydrotherapeutic measures. It is especially to be looked upon as something distinct and different from the antipyretic treatment. Upon this Brand and his followers insist.